

Claims

1. Process for the enzymatic production of a guanosine diphosphate(GDP)-6-deoxyhexose, wherein GDP-D-mannose or a precursor thereof is incubated in the presence of one or several enzymes which have GDP-D-mannose-4,6-dehydratase (Gmd, RfbD) activity and optionally GDP-4-keto-6-deoxy-D-mannose-3,5-epimerase-4-reductase (WcaG) or GDP-4-keto-6-deoxy-D-mannose-4-aminotransferase (RfbE) activity and the desired product is isolated.
2. Process as claimed in claim 1, wherein GDP-4-keto-6-deoxy-D-mannose, GDP-L-fucose or GDP-D-perosamine are produced from GDP-D-mannose.
3. Process as claimed in claim 1 or 2, wherein the enzymes required for the enzymatic synthesis can be obtained by cloning the genes or DNA fragments coding for these enzymes, insertion into one or several vectors and transformation in a bacterial or fungal host cell.
4. Process as claimed in claim 3, wherein the genes or corresponding DNA regions are firstly amplified.
5. Process as claimed in claim 3 or 4, wherein the genes or DNA fragments are manB, manC, gmd, rfbD, rfbE and/or wcaG.

6. Process as claimed in one of the claims 3 to 5, wherein the host cell is *E. coli*, *Bacillus subtilis*, *Corynebacterium* sp., *Staphylococcus carnosus*, *Streptomyces lividans*, *Saccharomyces cerevisiae*, *Schizosaccaromyces pombe*, *Hansenula polymorpha*, *Pichia stipidis*.
7. Process as claimed in claim 1, wherein mannose-6-phosphate and GTP are incubated in the presence of phosphomannomutase (ManB) and GDP-D-mannose synthase (ManC) and GDP-D-mannose or a secondary product thereof is isolated.
8. Process as claimed in one of the claims 1-7, wherein the process is carried out as a batch process.
9. Process as claimed in one of the claims 1-7, wherein the process is carried out continuously in an enzyme-membrane reactor.
10. Process as claimed in one of the claims 1-7 and 9, wherein a buffer solution containing the substrates or other starting substances is continuously percolated over a solid support material on which the enzymes are immobilized.
11. Use of a GDP-6-deoxyhexose produced as claimed in one of the claims 1 to 10 for coupling to glycosides, oligosaccharides or polysaccharides.

12. Use as claimed in claim 11 wherein the coupling is carried out in the presence of a protein having glycosyltransferase activity.
13. Process for the production of oligosaccharides or polysaccharides containing fucose or perosamine, wherein a GDP-activated hexose is transferred onto an oligosaccharide or polysaccharide by means of a protein which has fucosyltransferase perosamine-transferase activity.

Accepted
6.1.77